WHAT IS CLAIMED IS:

1. An apparatus for generating acoustic waves in a formation traversed by a wellbore comprising:

a multi-pole acoustic transmitter, the multi-pole acoustic transmitter comprising four monopole acoustic transmitter elements housed in a drill collar, the four monopole acoustic transmitter elements being spaced around a circumference of the drill collar at approximately equal intervals.

2. The apparatus of claim 1, wherein the four monopole acoustic transmitter elements may be operated to create a monopole, dipole, or quadrupole pressure field.

3. The apparatus of claim 1, wherein each of the four monopole acoustic transmitter elements comprises a cylindrical transducer and a canister surrounding the transducer.

4. The apparatus of claim 3, wherein the canister and the cylindrical transducer are filled with a fluid.

5. The apparatus of claim 4, wherein the canister comprises Radel®-R.

6. The apparatus of claim 5, wherein the canister comprises a thickness of approximately 1mm.

7. The apparatus of claim 3, wherein the cylindrical transducer comprises a PZT piezo-ceramic transducer.

8. The apparatus of claim 7, wherein the PZT piezo-ceramic transducer comprises a tube resonator.

9. The apparatus of claim 8, wherein a voltage is supplied to the PZT piezo-ceramic transducer at a frequency lower than a resonant frequency of the piezo-ceramic transducer.

10. The apparatus of claim 8, wherein a voltage is supplied to the PZT piezo-ceramic transducer at the resonant frequency of the fluid in the piezo-ceramic transducer.

11. The apparatus of claim 8, wherein the cylindrical transducer is sandwiched by spacers having one or more holes therein to avoid closing ends of the cylinder and prevent resonance inside the tube resonator.

12. The apparatus of claim 11, wherein the spacers are sandwiched by first and second heads, and wherein the first and second heads are connected by a rod.

13. The apparatus of claim 12, wherein the canister houses the spacers, the first and second heads, and the rod.

14. The apparatus of claim 7, wherein the PZT piezo-ceramic cylinder is a single piece and is uniformly polarized in a radial direction by applying a voltage across internal and external surfaces of the cylinder with electrodes.

15. The apparatus of claim 7, wherein a diameter of the PZT piezo-ceramic transducer expands or contracts via a d31 effect when a voltage is supplied.

16. The apparatus of claim 1, wherein each monopole acoustic transmitter element comprises a bellows-type pressure compensator to maintain or restore linearity between supplied voltage and output pressure.

17. The apparatus of claim 1, wherein the four monopole acoustic transmitter elements are housed in respective recesses in the drill collar and covered by a shield, the

shield comprising a hole for allowing pressure pulses generated by each monopole acoustic transmitter element to travel therethrough.

18. The apparatus of claim 17, wherein each of the respective recesses comprises an associated shield, the associated shield comprising a plurality of holes for allowing pressure pulses generated by each monopole acoustic transmitter to travel through.

19. The apparatus of claim 17, wherein the recesses comprise a depth of approximately 3.0 to 5.0 cm, a width of approximately 3.0 to 5.0 cm, and a length of approximately 25 to 35 cm.

20. The apparatus of claim 18, wherein the four monopole transmitter elements each comprise a PZT piezo ceramic cylinder having a length ranging between approximately 5 and 10 cm and a wall thickness ranging from approximately 3 to 6 mm.

21. The apparatus of claim 18, wherein the drill collar comprises a pipe having an outer diameter of approximately 17.5 cm and an inner diameter of approximately 6.1 cm.

22. An apparatus for generating an acoustic signal in response to input control signals comprising:

a plurality of cylindrical piezo ceramic elements spaced about a common circumference to form a multi-pole acoustic transmitter;

a plurality of polymer canisters, each of the plurality of polymer canisters associated with and housing one of the plurality of cylindrical piezo ceramic elements;

wherein each of the plurality of cylindrical piezo ceramic elements is uniformly polarized in a radial direction.

23. The apparatus of claim 22, wherein each of the plurality of cylindrical piezo ceramic elements comprises an internal and an external surface, wherein each of the internal

and external surfaces includes a conductive layer, the conductive layers comprising electrodes.

24. The apparatus of claim 23, wherein the electrodes uniformly polarize the cylindrical piezo ceramic elements radially.

25. The apparatus of claim 23, wherein the conductive layers comprise silver.

26. The apparatus of claim 23, wherein the conductive layers comprise nickel.

27. The apparatus of claim 22, wherein none of the plurality of cylindrical piezo ceramic elements is pre-stressed.

28. The apparatus of claim 27, wherein none of the plurality of cylindrical piezo ceramic elements is wound under tension with high strength fibers.

29. The apparatus of claim 22, wherein each of the plurality of canisters is filled with a fluid, and wherein the plurality of cylindrical piezo ceramic elements and canisters comprise fluid resonance tubes.

30. The apparatus of claim 29, wherein each of the plurality of cylindrical piezo ceramic elements comprises first and second ends, wherein the first and second ends are both open and spaced from the associated canister.

31. The apparatus of claim 29, wherein the input control signal comprises a frequency lower than a resonant frequency of the plurality of cylindrical piezo ceramic elements.

32. The apparatus of claim 31, wherein the input control signal comprises a frequency at a resonant frequency of the fluid inside the plurality of cylindrical piezo ceramic elements.

33. The apparatus of claim 32, wherein the resonant frequency of the fluid inside the plurality of cylindrical piezo ceramic elements is controlled by geometry of the plurality of the cylindrical piezo ceramic elements to be below the resonant frequency of the cylindrical piezo ceramic elements.

34. The apparatus of claim 22, wherein one or more of the plurality of cylindrical piezo ceramic elements comprises a bellows-type pressure compensator.

35. The apparatus of claim 22, wherein the plurality of polymer canister comprises Radel®-R.

36. The apparatus of claim 22, wherein the plurality of cylindrical piezo ceramic elements and associated canisters comprises four cylindrical piezo ceramic elements and canisters equally spaced about the circumference within respective recesses of a drill collar.

37. The apparatus of claim 36, wherein each of the four cylindrical piezo ceramic elements comprises a monopole source, and wherein the combination of the four cylindrical piezo ceramic elements comprises a monopole, dipole, or quadrupole source depending on the input control signals.

38. An acoustic transmitter apparatus comprising:

a drill collar for coupling to a drill string, the drill collar comprising a recess;

a cylindrical piezo ceramic element enclosed by a canister disposed in the recess;

a fluid contained by the canister;

wherein the cylindrical piezo ceramic element also comprises a tube resonator;

wherein a length of the cylindrical piezo ceramic element and the fluid are chosen such that a fluid resonance frequency is lower than a resonance frequency of the cylindrical piezo ceramic element.

39. The apparatus of claim 38, further comprising

four recesses in the drill collar equally spaced about a circumference of the drill collar; and

four cylindrical piezo ceramic elements enclosed by canisters disposed in the four recesses.

40. The apparatus of claim 39, wherein each of the four cylindrical piezo ceramic elements comprises a monopole source, but used in combination the four cylindrical piezo ceramic elements comprises a monopole, dipole, or quadrupole transmitter.

41. The apparatus of claim 38, wherein the cylindrical piezo ceramic element is uniformly polarized in a radial direction.

42. The apparatus of claim 38, wherein the cylindrical piezo ceramic element further comprises a bellows-type pressure compensator, and wherein the canister comprises Radel®-R.

43. A method of logging a wellbore while drilling comprising:

providing an acoustic transmitter and a plurality of receivers on a drill string, the acoustic transmitter arranged to provide a monopole, dipole, or quadrupole source from a plurality of monopole source elements;

activating the acoustic transmitter; and

receiving and recording waveform data.

44. The method of claim 43, further comprising enhancing output pressure from the acoustic transmitter by employing the acoustic transmitter as a resonance tube and

applying a signal to the acoustic transmitter at a fluid resonance frequency of the resonance tube.

45. The method of claim 43, further comprising using waves generated by a d31 effect from the transducer and not waves generated by a D33 effect.

46. The method of claim 43, wherein providing an acoustic transmitter further comprises providing a cylindrical piezo ceramic element and polarizing the element uniformly in a radial direction.

47. The method of claim 46, wherein the polarizing further comprises coating an inner and an outer surface of the element with a conductor to create two electrodes, and applying a voltage thereacross.

48. A method of making an acoustic transmitter comprising:

providing a cylindrical piezo ceramic element;

coating an inner and an outer surface of the element with a conductive layer to create electrodes;

housing the cylindrical piezo ceramic element in a canister;

filling the canister with a fluid; and

sizing the cylindrical piezo ceramic element such that a fluid resonance frequency in the cylindrical piezo ceramic element is lower than a resonance frequency of the piezo ceramic element itself.

49. The method of claim 48, wherein the cylindrical piezo ceramic element is uniformly polarized in a radial direction by the electrodes.

50. The method of claim 48, further comprising:

providing four cylindrical piezo ceramic elements;

inserting the four cylindrical piezo ceramic elements in four recesses equally spaced about a circumference of a drilling collar; and

enclosing the four cylindrical piezo ceramic elements with four plates having windows therein.

51. The method of claim 48, further comprising adding a bellows-type pressure compensator to the cylindrical piezo ceramic element.